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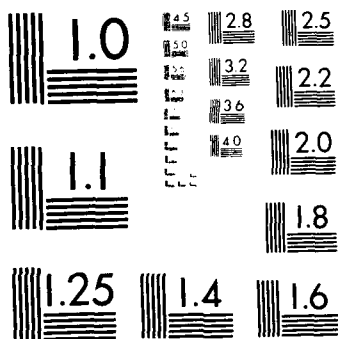
BUILDING COMPONENT MAINTENANCE AND REPAIR DATA BASE:
ELECTRICAL SYSTEMS(U) CONSTRUCTION ENGINEERING RESEARCH
LAB (ARMY) CHAMPAIGN IL E S NEELY ET AL. MAY 91
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**Army Corps
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AD-A238 881



USACERL Special Report P-91/19
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Building Component Maintenance and Repair Data Base: Electrical Systems

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This research project has provided improved maintenance resource data for use during facility planning, design, and maintenance activities. Data bases and computer systems have been developed to assist planners in preparing DD Form 1391 documentation, designers in life-cycle cost component selection, and maintainers in resource planning. The data bases and computer systems are being used by U.S. Army Corps of Engineers (USACE) designers at the district and installation levels and by resource programmers at USACE Headquarters, and Army Major Commands and installations. These research products may also be useful to other government agencies and the private sector.

This report describes the building task maintenance and repair data base development and gives examples of its application. It is one of a series of special reports on the maintenance and repair data base. While this report describes electrical systems, other reports in the series cover heating, ventilation, and air-conditioning systems, plumbing systems, and architectural systems.

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FOREWORD

This research was conducted for the Directorate of Military Programs, Headquarters, U.S. Army Corps of Engineers (HQUSACE) and the Office of the Assistant Chief of Engineers under various research, development, testing, and evaluation (RDTE) and reimbursable funding documents. Work began under RDTE in 1980 and continued in reimbursable projects during 1984 through 1989. The technical monitor for the RDTE part was Dr. Larry Schindler (CEMP-EC) and for the reimbursable part was Ms. Val Corbridge (DAEN-ZCF-R).

The work was performed by the Facility Systems Division (FS), U.S. Army Construction Engineering Research Laboratory (USACERL). The Principal Investigators were Dr. Edgar Neely and Mr. Robert Neathammer (USACERL-FS). The primary contractor for much of the data development was the Department of Architectural Engineering, Pennsylvania State University. Dr. Michael O'Connor is Chief of USACERL-FS.

COL Everett R. Thomas is Commander and Director of USACERL, and Dr. L.R. Shaffer is Technical Director.

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BUILDING COMPONENT MAINTENANCE AND REPAIR DATA BASE: ELECTRICAL SYSTEMS

1 INTRODUCTION

Background

Maintenance* and repair (M&R) cost estimates are needed during planning, design, and operations/maintenance of Army facilities. During planning, life-cycle costs are needed to evaluate alternative ways of meeting requirements (e.g., lease, new construction, renovate existing facilities). During design, M&R requirements for various types of components, such as built-up or shingle roofs, are needed so that the total life-cycle cost of different designs can be minimized. Finally, once the facility has been constructed, outyear predictions of maintenance and repair costs are needed so that enough funds can be programmed to ensure that Army facilities are maintained properly and do not deteriorate due to lack of maintenance.

The Directorate of Engineering and Construction (EC), Headquarters, U.S. Army Corps of Engineers (HQUSACE),** asked the U.S. Army Construction Engineering Research Laboratory (USACERL) to coordinate the assembly of a single centralized maintenance and repair data base for use by Corps designers. This research was required because designers were not able to obtain reliable maintenance and repair data to support their life-cycle cost (LCC) analysis from installations or from the technical literature. One of the first tasks in the research effort was to determine if reliable data bases, which could be adapted for Corps use, existed in government or private industry. Comprehensive data bases of maintenance costs for government and private sector facilities did not exist. The little data available always depended on widely varying standards of maintenance used to maintain the facilities for which the data was collected and thus was unreliable for prediction purposes. Recognizing this, HQUSACE asked USACERL to develop a maintenance and repair cost data base. This data is for use by U.S. Army Corps of Engineers (USACE) designers in performing life-cycle cost analyses during the design of new facilities. Initial results were presented in several USACERL reports.¹

Soon after this request, the Facilities Programming and Budgeting Branch of the Facilities Engineering Directorate asked USACERL to develop prediction models for outyear maintenance requirements of the Army facility inventory. The Programming Office of EC, responsible for Military Construction, Army (MCA) planning, also requested that USACERL provide methods and automated tools to help installations perform economic analyses. Part of the objective was to allow analysts to obtain future maintenance cost data.

*Maintenance in this report means all work required to keep a facility in good operating condition; it includes all maintenance, repair, and replacement of components required over the life of a facility.

**At the time of this request, EC was part of the Office of the Chief of Engineers, which has since reorganized. In addition, EC has now become the Directorate of Military Programs.

¹ R.D. Neathammer, *Life-Cycle Cost Database Design and Sample Cost Data Development*, Interim Report P-120/ADA0997222 (U.S. Army Construction Engineering Research Laboratory [USACERL], February 1981); R.D. Neathammer, *Life-Cycle Cost Database: Vol I, Design, and Vol II, Sample Data Development*, Technical Report P-139/ADA126644 and ADA126645 (USACERL, January 1983), Appendices E through G.

In response to these requests, USACERL began a multiyear effort to develop a comprehensive maintenance and repair cost research program for buildings. This coordinated program is the key to all detailed estimation of future maintenance costs for Army facilities.

Research Performed and Reports Published

This is one of several interrelated reports addressing maintenance resource prediction in the facility life-cycle process. The total research effort is described in a USACERL Technical Report.²

The first research product was a data base containing maintenance tasks related to every building construction component. This data base provides labor, material, and equipment resource information. The frequency of task occurrence is also included. This information is published in a series of four USACERL Special Reports by engineering systems: (1) architectural, (2) heating, ventilation, and air-conditioning (HVAC), (3) plumbing, and (4) electrical. The title for the series is *Maintenance Task Data Base for Buildings*.³ Table 1 shows an example from this data base. This data is also available in electronic form. The data base is used in a personal computer (PC) system under the Disk Operating System (DOS). This computer program allows a facility to be defined by entering the components and component quantities comprising the facility. The tasks are used to determine the resources required annually to keep the facility maintained.

The second research product was a component resource summary for the first 25 years of a facility. The tasks for the component were scheduled and combined into one set of annual resource requirements. This annual resource information is published in a series of four USACERL Special Reports titled *Building Component Maintenance and Repair Data Base*.⁴ An example from this data base is shown in Table 2. The data base is also available in electronic form. This data can be used to perform special economic analyses such as one for a 20-year life using a 10 percent discount rate.

The third research product was a set of 25-year present worth factor tables for use by designers in selecting components for discount rates of 7 and 10 percent. The annual component resource values were multiplied by the appropriate present worth factor and added for the 25 years to produce one set of resource values. This information is published in a series of four USACERL Special Reports titled

² E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Resource Prediction in the Facility Life-Cycle Process*, Technical Report P-91/10 (USACERL, March 1991).

³ E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings: Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/21 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings: Plumbing Systems*, Special Report P-91/18 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings: Electrical Systems*, Special Report P-91/25 (USACERL, May 1991), and E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings: Architectural Systems*, Special Report P-91/23 (USACERL, May 1991).

⁴ E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings: Architectural Systems*, Special Report P-91/27 (USACERL, May 1991); E. S. Neely, R. D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings: Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/22 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings: Plumbing Systems*, Special Report P-91/30 (USACERL, May 1991).

Table 1

Typical Task Data Form

Task Code: 1131411Component: MERCURY VAPOR FXT. 175W. System: LIGHTING SYSTEM Subsystem: LIGHTING FIXTURESTask Description: M/R MAINTENANCE AND REPAIRUnit of Measure: COUNT Frequency of Occurrence: H: 5.00 A: 10.00 L: 20.00
Once every (H, A, L) yearsPersons per Team: 1 Task Duration: 0.6154 hoursTrade: ELECTRICAL INT. Task Classification: 0

Labor Resources		Material Resources	
Subtask Description	Labor Hours	Description	Quantity Unit Cost
1. REMOVE AND REINSTALL LOUVER	0.004100	BALLAST	1 50.0000
2. REMOVE AND REINSTALL 1 TUBE	0.071200		50.0000
3. REMOVE OLD/REINSTALL BALLAST	0.384000		
4. TEST FIXTURES	0.014100		
SUMMARY			
Resources UOM	Direct	Indirect	Total
Labor Hours	0.473400	0.142020	0.615420
Material Cost	50.000000		50.000000
Equipment Hours			0.615420

Table 2

Typical Components Summary

CACES No.: 113130 - Flour. Lighting Fixt. 80W.

113141 - Mercury Vapor Fixt. 175W

Labor Hours	Materials \$	Equipment Hours	YR	Labor Hours	Materials \$	Equipment Hours
0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.8784	20.6700	0.8784	10	0.6840	81.6200	0.6840
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.7413	67.8400	0.7413	20	0.5816	134.6200	0.5816
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

All data is per fixture.

*Building Maintenance and Repair Data for Life-Cycle Cost Analyses.*⁵ Table 3 shows an example from this data base. The data base is also available in electronic form. The first three resource columns provide data to allow designers to calculate the life-cycle costs at any location by multiplying by the correct labor rate, equipment rate, and material geographic factor. The multiplication and addition have been performed for the Military District of Washington, DC, and results are given in the fourth column of the table. The right section of the table is information that can be entered into computer systems that perform life-cycle cost analysis.

⁵ E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Architectural Systems*, Special Report P-91/17 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/20 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Plumbing Systems*, Special Report P-91/24 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Electrical Systems*, Special Report P-91/26 (USACERL, May 1991).

Table 3

Life-Cycle Cost Analysis

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS (\$ PER UNIT MEASURE)												PAGE 97
COMPONENT DESCRIPTION	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d = 10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS							
	By Resources			Washington D.C. Total	Annual Maintenance and Repair			Replacement and High Costs Tasks				
	labor	material	equipment		labor	material	equipment	Yr	labor	material	equipment	
LIGHTING SYSTEM LIGHTING FIXTURES INCANDESCENT LIGHTING FIXT QUARTZ FIXTURE FLOUR. LIGHTING FIXT. 80W. MERCURY VAPOR FIXT. 175W METAL-HALIDE FIXT. 175W. EMERGENCY LIGHTING FIXT. H.P. SODIUM FIXT. 250W. L.P. SODIUM FIXT. 200W.	um											
	CT	0.12489	2.99191	0.12489	6.20	0.01012	0.14063	0.01012	20	0.44850	16.96000	0.44850
	CT	0.18095	21.69174	0.18095	26.33	0.01796	2.07824	0.01796	20	0.44850	58.30000	0.44850
	CT	0.35366	14.22361	0.35366	23.30	0.03731	0.87794	0.03731	20	0.74126	67.84000	0.74126
	CT	0.27593	40.56016	0.27593	47.64	0.02905	3.46673	0.02905	20	0.58162	134.62000	0.58162
	CT	0.31034	88.72582	0.31034	96.69	0.03626	8.17686	0.03626	20	0.43550	197.16000	0.43550
	CT	0.71078	18.09790	0.71046	34.32	0.04779	0.60201	0.04779	20	3.14782	100.70000	3.14782
	CT	0.30038	167.06998	0.15019	174.29	0.03465	16.20810	0.01733	20	0.44850	436.72000	0.22425
	CT	0.30038	99.54375	0.15019	106.77	0.03465	8.32916	0.01733	20	0.44850	341.32000	0.22425

A fourth research product was a PC system that allows facilities to be modeled by entering the components that comprise the facility. Future years resource predictions are produced by applying the individual tasks and then forming resource summaries by subsystems, systems, facilities, installations, reporting installations, Major Commands (MACOMS) and Army. A summary level computer system was also developed for use by the Department of the Army (DA) and MACOMS. The summary level system applies the most basic data contained in the current facility real property inventory files: (1) current facility use, (2) floor area, and (3) construction date. Users and systems manuals will be published as USACERL ADP Reports.

Objective

The objective of this report is to describe the component summaries for electrical systems and give examples for using these tables in performing the component during the design process.

Approach

The first activity in the research was to survey the literature for available maintenance data. No comprehensive task resource data base was located. The Navy has developed a series of manuals dealing with labor hours required to perform several basic maintenance tasks. This work has been adopted by the Department of Defense (DOD) for tri-service use. A series of Technical Bulletins (TBs) under the general title *Engineered Performance Standards* has been published.

The next activity was to survey USACE District offices to solicit their input for a data base. A guiding committee composed of District personnel, installation representatives, and private sector consultants met and agreed upon a general data base design. More importantly, they recommended that the data base be developed using the Engineered Performance Standards rather than historical data.

Once the data base was developed, component summaries were created by summing all tasks for a component. These summaries were then input into a program that computed present worth values for each component.

The calculation procedures described in this report were performed and summarized for standard Army life-cycle analysis of 25 years with a 7 or 10 percent present worth factor. Final results are published in the USACERL Special report series *Building Maintenance and Repair Data Base for Life-Cycle Analyses*.

Scope

The 25-year component resources summary tables are for DOD designers and can also be used by those in the private sector.

Mode of Technology Transfer

The tables pertinent to designer use will be issued as a supplement to Technical Manual (TM) 5-802-1, *Economic Studies for Military Construction Design—Applications*.

2 PROBLEM DEFINITION

In the facility life-cycle process, costs are incurred in construction, operation, maintenance, and disposal of a facility. Past emphasis during the planning, design, and construction phases has been on estimating initial construction costs. The impact of operating and maintaining facilities has always been a secondary consideration. In many cases, the operation and maintenance (O&M) costs are far greater than initial construction costs. Building owners are concerned with the total ownership costs of facilities rather than just the initial construction costs.

The Army has realized the importance of performing total life-cycle cost analyses for facilities at the design stage of accurately forecasting these costs for funds programming. HQUSACE asked USACERL in 1980 to develop a method of estimating future maintenance costs for buildings. In 1982, the programming branch of the former Facilities Engineering Directorate asked USACERL to develop effective models for forecasting facility maintenance resource requirements based on the actual facility.

Life-cycle cost economic studies are an integral part of facility design in the MCA program. Requirements for performing these studies are given in:

- Statutes, Code of Federal Regulations, and Executive Orders for performing analyses when energy is a key cost and for wastewater treatment plants
- USACE *Architectural and Engineering Instructions: Design Criteria*
- Army Regulation (AR) 11-28, *Economic Analysis and Program Evaluation for Resource Management* for general economic analyses
- TM 5-802-1, *Economic Studies for Military Construction Design--Applications*

The main purpose of these studies is to minimize the life-cycle costs of Army facilities.

To perform life-cycle cost analyses on facility designs, three categories of costs are needed: initial, operating, and maintenance. Initial costs are usually easy to estimate through existing cost estimating systems such as the Corps of Engineers Computer Assisted Cost Estimating System (CACES) and standard publications such as Means or Dodge. Operating costs can be estimated by using energy consumption models such as the Corps of Engineers Building Loads Analysis and System Thermodynamics (BLAST) program or the Trane Company's Trace program. However, accurate estimates of maintenance costs are not available.

There are no comprehensive data bases of maintenance costs for building components either in the private sector or State/Federal Governments. Some historical data is available from the Building Owners' and Managers' Association reports. Within the Army, the Integrated Facilities System (IFS) contains some historical data; however, it does not have a feature for retaining several types of a building component (e.g., having brick and wood exteriors or three types of floor covering). Moreover, the data in IFS has not been kept current. For example, at one installation several family housing units were shown as having wood siding when, in fact, they had been covered with aluminum siding several years earlier.

3 DATA BASE DEVELOPMENT

The first step in data base development was to subdivide a building into systems, subsystems, and components, and define maintenance tasks. The second step was to estimate resources for each task. The third step was to schedule these tasks in appropriate years and combine them into one total for each component.

Building Subdivision

The UNIFORMAT method of dividing a building into systems, subsystems, and components was adopted since it is used by most Federal agencies and many private organizations. Systems requiring little maintenance such as foundations and superstructure were not subdivided.

The level of component detail was determined by maintenance and design personnel. This level varied, depending on the facility classification (e.g., historical) and the costs to collect and maintain data versus the benefit. Appendix A contains a complete list of the subdivisions.

Task Data Development

A typical task data form is shown in Table 1. The Engineered Performance Standards (EPS) adopted by all DOD agencies were applied to determine labor resources. A USACERL Technical Report contains a full explanation of use of EPS in developing these resources.⁶

Standard references such as DA criteria documents, Corps of Engineers Unit Price Manuals, Means, and Dodge were used to determine the Washington, DC, area material costs. Material costs in the data base are given in July 1988 dollars for this area. Material costs can be adjusted for site location by applying a geographic location adjustment factor similar to the values shown in Appendix B (LCC Only). Material costs can be adjusted for inflation by applying a time adjustment factor from July 1988 to the new point in time (i.e., inflation indexes provided by the HQUSACE cost estimating branch can be used to adjust the 1988 material costs to future years).

Task frequencies are the most subjective portion of the data base and were determined by applying professional experience, trade publication data, and data in manufacturers' literature. A range of values is given to provide more information than one average frequency.

The data base has been reviewed by 10 installation Directorates of Engineering and Housing (DEHs) and has been determined to accurately represent the resources required to perform the tasks. This data base serves as the foundation for the tables published in this report. The complete data base is not duplicated in this report due to its size, but is available in the USACERL Special Report series titled *Maintenance Task Data Base for Buildings*.

⁶ E.S. Neely, et al, TR P-91/10 (March 1991).

Component Summary Tables

Table 2 is a typical component summary. The development process is illustrated by using the labor resource for the 175W mercury vapor fixture. All tasks related to the mercury vapor component are listed in Table 4, with a summary in Table 5. The average frequency is used to project times of occurrence of M&R tasks for the first 25-year period as shown in Table 6. The "total" column in Table 6 is identical to the labor column in Table 2.

Table 4
Task GT-309*

No.	Reference	Work Unit Description	Hours	Units
1	PWG-18-VI	Remove and reinstall louver, glass or plastic diffuser	.00410	Fixture
2	PWG-18-II	Remove and reinstall 1 tube, including 2 fiber locks, using ladder	.02330 .04790	Fixture Fixture
3	PWMU-1-8374	Remove old and reinstall new ballast in fluorescent fixture	.03560 .34840	Fixture Fixture
4	PWMU-1-8383	Test fixture	.01410	Fixture

* GT-309 = .47340 Hrs Per Fixture.

Table 5

Task Summary Data for 175W Mercury Vapor Fixture

Army Wide Task/Basic Task Structure List			Tree id: BF		Group id: B5								
UM - Unit of Measure		TRD - Trade Index	Class - Task Classification			TWPMTH - Task Work Performance Method							
CACES	DESCRIPTION		UM	TRD	CLASS	HIGH FREQ	AVE FREQ	LOW FREQ	LABOR HOURS	MATERIAL COSTS	EQUIP HOURS		
1131101	MAINTENANCE AND REPAIR		1	2	0	10.00	20.00	30.00	.390000	10.000000	.390000		
1131102	REPLACE LAMP		1	2	0	2.00	5.00	8.00	.068640	.900000	.068640		
1131103	REPLACE LIGHTING FIXTURE		1	2	1	10.00	20.00	40.00	.448500	16.000000	.448500		
4 2	1131200 QUARTZ LIGHTING FIXTURE												
1131201	MAINTENANCE AND REPAIR		1	2	0	5.00	10.00	20.00	.390000	1.160000	.390000		
1131202	REPLACE LAMP		1	2	0	5.00	10.00	15.00	.032760	45.000000	.032760		
1131203	REPLACE FIXTURE		1	2	1	10.00	20.00	40.00	.448500	55.000000	.448500		
4 3	1131300 FLUORESCENT LIGHTING FIXTURE												
1131301	MAINTENANCE AND REPAIR		1	2	0	5.00	10.00	20.00	.615420	50.000000	.615420		
1131302	REPLACE LAMPS (2)		1	2	0	5.00	10.00	15.00	.045890	4.500000	.045890		
1131303	REPLACE FIXTURE		1	2	1	10.00	20.00	40.00	.741260	64.000000	.741260		
4 4	1131400 HID												
5 1	1131410 HID, MERCURY VAPOR FIXTURES, 175W												
1131411	MAINTENANCE AND REPAIR		1	2	0	5.00	10.00	20.00	.615420	5.000000	.615420		
1131412	REPLACE LAMP		1	2	0	5.00	10.00	15.00	.068640	27.000000	.068640		
1131413	REPLACE FIXTURE		1	2	1	10.00	20.00	40.00	.581620	127.000000	.581620		
5 2	1131420 HID, METAL HALID FIXTURE, 250W												
1131421	MAINTENANCE AND REPAIR		1	2	0	5.00	10.00	20.00	.615420	65.000000	.615420		
1131422	REPLACE LAMP		1	2	0	3.00	5.00	8.00	.068640	40.000000	.068640		
1131423	REPLACE FIXTURE		1	2	1	10.00	20.00	40.00	.435500	186.000000	.435500		

Table 6

175W Mercury Vapor Lighting Fixture Spreadsheet - Labor Hours

YEAR	TASK1 1131411	TASK2 1131412	TASK3 1131413	TOTAL LABOR HRS	10% P.W.F.	P. W. LABOR HOURS
1				0.000000	0.7164	0.000000
2				0.000000	0.6512	0.000000
3				0.000000	0.5920	0.000000
4				0.000000	0.5382	0.000000
5				0.000000	0.4893	0.000000
6				0.000000	0.4448	0.000000
7				0.000000	0.4044	0.000000
8				0.000000	0.3676	0.000000
9				0.000000	0.3342	0.000000
10	0.615420	0.068640		0.684060	0.3038	0.207817
11				0.000000	0.2762	0.000000
12				0.000000	0.2511	0.000000
13				0.000000	0.2283	0.000000
14				0.000000	0.2075	0.000000
15				0.000000	0.1886	0.000000
16				0.000000	0.1715	0.000000
17				0.000000	0.1559	0.000000
18				0.000000	0.1417	0.000000
19				0.000000	0.1288	0.000000
20			0.581620	0.581620	0.1171	0.068108
21				0.000000	0.1065	0.000000
22				0.000000	0.0968	0.000000
23				0.000000	0.0880	0.000000
24				0.000000	0.0800	0.000000
25				0.000000	0.0727	0.000000
TOTAL						0.275925

4 DATA BASE APPLICATION EXAMPLES

If the analysis to be performed is for a 25-year period for either a 7 or 10 percent discount factor (from Tables 7 and 8), the calculations described in this chapter have been simplified and published in the USACERL Special Report series titled *Building Maintenance and Repair Data for Life-Cycle Cost Analyses*. The procedure described in this chapter can be used for other analyses in which the period is less than 25 years and/or a discount rate other than 7 or 10 percent is specified.

Appendix A contains an index of components under the electrical systems group. Major categories are:

- 110 Interior Electric
- 111 Service & Distribution
- 112 Power System
- 113 Lighting System
- 114 Grounding System

- 120 Special Interior Electrical Systems
- 121 Sound System
- 122 Alarm System
- 123 Television System
- 124 Control System
- 125 Hospital System
- 126 Clock & Program System
- 127 Electrical Heating System
- 128 Power Generating System

Disposal/Costs/Retention Value

If retention value is to be considered, it should be expressed as a percentage of the initial cost. The present worth of this value can be subtracted from the final net present worth.

Example 1—20-Year Analysis

Develop 20-year cost data using a 10 percent discount rate for a mercury vapor light fixture. Initial construction costs can be obtained from the District cost estimating office or from Means or Dodge. Labor and equipment rates are obtained from the installation DEH. The geographic location adjustment factor can be taken from AR 415-17 and the Engineering Improvement Recommendation System (EIRS) Bulletin which updates the data in the AR. Inflation factors can be obtained from the HQUSACE cost estimating office. Retention value of 0 is based on an estimated life of 20 years from Table 1.

Electrician labor rate	\$12.50
Equipment rate	\$2.60
Geographical location factor	1.10

Material time adjustment factor, 1988 to 1989	1.02
Initial cost	\$400
Number of fixtures	10

Table 8 lists 10 percent discount present worth factors. These factors assume a 3-year lead time from the study date to the beneficial occupancy date. The calculation process is relatively simple. The resources shown in Table 2 are multiplied by the present worth factors in Table 8 and then totaled. The next step is to multiply the labor hours by the labor rate, the equipment hours by the equipment rate, and the material costs by the geographical location factor and the time adjustment factor. The three values are added to produce a final dollar per UM value as shown in Table 9. This rate is multiplied by the number of fixtures and added to the initial construction cost to obtain the life-cycle cost:

$$(48.78264/\text{unit} + \$400/\text{unit}) \times 10 \text{ fixtures} = \$4487.83 \quad [\text{Eq 1}]$$

Example 2—Changed Study Date

Use the same data in example 1, except that the study date is only 2 years before the beneficial occupancy date. The present worth must be adjusted for one less year of discounting. The discount factor for 1 year is $1/(1.10)$, so the value calculated above must be multiplied by 1.10. The answer for a 2-year lead time is $1.10 \times \$4487.83 = \4936.61

Table 7

7 Percent Discount Factors From Date of Study*

Years from BOD	End of Year	Accumulated End of Year
1	0.9346	0.9346
2	0.8734	1.8080
3	0.8163	2.6243
4	0.7629	3.3872
5	0.7130	4.1002
6	0.6663	4.7665
7	0.6227	5.3893
8	0.5820	5.9713
9	0.5439	6.5152
10	0.5083	7.0236
11	0.4751	7.4987
12	0.4440	7.9427
13	0.4150	8.3576
14	0.3878	8.7455
15	0.3624	9.1079
16	0.3387	9.4466
17	0.3166	9.7632
18	0.2959	10.0591
19	0.2765	10.3356
20	0.2584	10.5940
21	0.2415	10.8355
22	0.2257	11.0612
23	0.2109	11.2722
24	0.1971	11.4693
25	0.1842	11.6536
(Retention value at end of 25th year)		

*Date of Study (DOS) is the Beneficial Occupancy Date (BOD)

Table 8

10 Percent Discount Factors From Date of Study

Year from BOD	Factors		Accumulated Mid-Year
	Mid-Year	End of Year	
-2		0.9091	0.0
-1		0.8265	0.0
BOD 0		0.7513	0.0
1	0.7164		0.7164
2	0.6512		1.3676
3	0.5920		1.9596
4	0.5382		2.4978
5	0.4893		2.9871
6	0.4448		3.4319
7	0.4044		3.8362
8	0.3676		4.2038
9	0.3342		4.5380
10	0.3038		4.8418
11	0.2762		5.1180
12	0.2511		5.3691
13	0.2283		5.5973
14	0.2075		5.8048
15	0.1886		5.9935
16	0.1715		6.1650
17	0.1559		6.3209
18	0.1417		6.4626
19	0.1288		6.5914
20	0.1171		6.7086
21	0.1065		6.8150
22	0.0968		6.9118
23	0.0880		6.9998
24	0.0800		7.0799
25	0.0727		7.1526
Retention Value at End of 25th Year		0.0693	

Table 9

10 Percent Calculation Spreadsheet*

YEAR	10% P.W.F.	P.W. MATERIAL COSTS	P.W. LABOR HOURS	P.W. EQUIP. HOURS
1	0.7164	0.000000	0.000000	0.000000
2	0.6512	0.000000	0.000000	0.000000
3	0.5920	0.000000	0.000000	0.000000
4	0.5382	0.000000	0.000000	0.000000
5	0.4893	0.000000	0.000000	0.000000
6	0.4448	0.000000	0.000000	0.000000
7	0.4044	0.000000	0.000000	0.000000
8	0.3676	0.000000	0.000000	0.000000
9	0.3342	0.000000	0.000000	0.000000
10	0.3038	24.796156	0.207817	0.207817
11	0.2762	0.000000	0.000000	0.000000
12	0.2511	0.000000	0.000000	0.000000
13	0.2283	0.000000	0.000000	0.000000
14	0.2075	0.000000	0.000000	0.000000
15	0.1886	0.000000	0.000000	0.000000
16	0.1715	0.000000	0.000000	0.000000
17	0.1559	0.000000	0.000000	0.000000
18	0.1417	0.000000	0.000000	0.000000
19	0.1288	0.000000	0.000000	0.000000
20	0.1171	15.764002	0.068108	0.068108
21	0.1065	0.000000	0.000000	0.000000
22	0.0968	0.000000	0.000000	0.000000
23	0.0880	0.000000	0.000000	0.000000
24	0.0800	0.000000	0.000000	0.000000
25	0.0727	0.000000	0.000000	0.000000
TOTAL=		40.560158	0.275925	0.275925
RATE		1.1	\$12.50	\$2.60
COST /UNIT		44.616174	3.449064	0.717405
		TOTAL COST/UNIT		48.782643

*All data from Table 2 have been multiplied by the present worth value in column 2 to give the present worth values for material, labor, and equipment.

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LIST OF ACRONYMS

ACE	Assistant Chief of Engineers
AMS	Army Management System
APC	Account Processing Code
AR	Army Regulation
ARR	Annual Requirements Report
ASTM	American Society for Testing and Materials
BLAST	Building Loads Analysis and System Thermodynamics
BMAR	Backlog of Maintenance and Repair
BOD	Beneficial Occupancy Date
CA	Commercial Activities
CACES	Computer-Assisted Cost Estimating System
CONUS	Continental United States
DA	Department of the Army
DEH	Directorate of Engineering and Housing
DOD	Department of Defense
DOS	Date of Study
EA	Economic Analysis
EC	Engineering Construction
EIRS	Engineering Improvement Recommendation System
EOS	End of Study
EPS	Engineered Performance Standards
HQ-IFS	Headquarters - Integrated Facilities
HQDA	Headquarters Department of the Army
HVAC	Heating, Ventilation, and Air-Conditioning
IFS	Integrated Facilities System

IJO	Individual Job Order
LCC	Life-Cycle Cost
LCCID	Life-Cycle Cost in Design
M&R	Maintenance and Repair
MACOM	Major Command
MCA	Military Construction, Army
MRPM	Maintenance Resource Prediction Model
OCE	Office of the Chief of Engineers
PAVER	Pavement Maintenance Management System
PAX	Programming, Administration, and Execution System
PC	Personal Computer
PM	Preventive Maintenance
R&D	Research and Development
RAM	Random Access Memory
RMF	Recurring Maintenance Factor
RPI	Real Property Inventory
RPIANS	Real Property Planning System
RPMS	Real Property Management System
SO	Service Order
STANFINS	Standard Army Financial System
TB	Technical Bulletin
URR	Unconstrained Requirements Report
USACE	U.S. Army Corps of Engineers
USACERL	U.S. Army Construction Engineering Research Laboratory
USAEHSC	U.S. Army Engineering and Housing Support Center

APPENDIX A:

COMPONENT RESOURCE DATA BASE--DATASHEETS

25 YEAR COMPONENT LISTING

Cases No.:111200-OVERHEAD SERVICE, SPLICE 111310-SWITCHGEAR, MAINFR.,1200a.

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	2	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	3	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	4	0.7800	0.0000	0.7800
0.6500	0.0000	0.6500	5	7.4802	643.4200	7.4802
0.0000	0.0000	0.0000	6	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	7	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	8	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	9	0.7800	0.0000	0.7800
0.6500	0.0000	0.6500	10	7.4802	643.4200	7.4802
0.0000	0.0000	0.0000	11	0.7800	0.0000	0.7800
7.5750	1.0600	7.5750	12	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	13	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	14	0.7800	0.0000	0.7800
0.6500	0.0000	0.6500	15	7.4802	643.4200	7.4802
0.0000	0.0000	0.0000	16	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	17	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	18	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	19	0.7800	0.0000	0.7800
0.6500	0.0000	0.6500	20	1.9015	1318.1100	0.6338
0.0000	0.0000	0.0000	21	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	22	0.7800	0.0000	0.7800
0.0000	0.0000	0.0000	23	0.7800	0.0000	0.7800
7.5750	1.0600	7.5750	24	0.7800	0.0000	0.7800
0.6500	0.0000	0.6500	25	7.4802	643.4200	7.4802

Cases No.:111320-FUSES

111410-TRANS.,LIQUID FILLED >600V

0.0000	0.0000	0.0000	1	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	2	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	3	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	4	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	5	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	6	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	7	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	8	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	9	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	10	4.6691	1892.1000	4.6691
0.0000	0.0000	0.0000	11	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	12	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	13	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	14	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	15	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	16	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	17	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	18	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	19	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	20	4.6691	1892.1000	4.6691
0.0000	0.0000	0.0000	21	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	22	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	23	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	24	0.7691	0.0000	0.7691
0.0000	0.0000	0.0000	25	0.7691	0.0000	0.7691

Cases No.:111420-TRANS., DRY, > 15,000V.

111510-SWITCHGEAR, INDOOR, < 600V.

0.7691	0.0000	0.7691	1	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	2	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	3	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	4	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	5	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	6	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	7	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	8	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	9	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	10	0.1040	3.4450	0.1040
0.7691	0.0000	0.7691	11	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	12	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	13	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	14	0.0000	0.0000	0.0000
2.7191	26.5000	2.7191	15	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	16	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	17	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	18	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	19	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	20	0.1040	3.4450	0.1040
0.7691	0.0000	0.7691	21	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	22	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	23	0.0000	0.0000	0.0000
0.7691	0.0000	0.7691	24	0.0130	0.0000	0.0130
0.7691	0.0000	0.7691	25	0.0000	0.0000	0.0000

25 YEAR COMPONENT LISTING
Caces No.:111520-SWITCHGEAR, INDOOR, > 600V. 111610-TRANS., LIQUID FILLED <600V

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	2	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	3	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	4	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	5	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	6	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	7	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	8	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	9	1.3000	0.0000	1.3000
0.1040	8.7450	0.1040	10	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	11	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	12	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	13	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	14	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	15	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	16	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	17	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	18	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	19	1.3000	0.0000	1.3000
0.1040	8.7450	0.1040	20	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	21	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	22	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	23	1.3000	0.0000	1.3000
0.0130	0.0000	0.0130	24	1.3000	0.0000	1.3000
0.0000	0.0000	0.0000	25	2.6000	26.5000	2.6000

Caces No.:111620-TRANS., DRY, < 15,000V. 111710-SWITCHGEAR, INDOOR, <600V.

0.0780	0.0000	0.0780	1	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	2	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	3	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	4	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	5	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	6	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	7	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	8	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	9	0.0130	0.0000	0.0130
1.3780	79.5000	1.3780	10	0.1040	3.4450	0.1040
0.0780	0.0000	0.0780	11	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	12	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	13	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	14	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	15	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	16	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	17	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	18	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	19	0.0000	0.0000	0.0000
1.3780	79.5000	1.3780	20	0.1040	3.4450	0.1040
0.0780	0.0000	0.0780	21	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	22	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	23	0.0000	0.0000	0.0000
0.0780	0.0000	0.0780	24	0.0130	0.0000	0.0130
0.0780	0.0000	0.0780	25	0.0000	0.0000	0.0000

Caces No.:111720-SWITCHGEAR, INDOOR, > 600V. 111810-CABLE, THRMPLST., <15,000V.

0.0130	0.0000	0.0130	1	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	2	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	3	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	4	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	5	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	6	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	7	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	8	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	9	0.0000	0.0000	0.0000
0.1170	13.2500	0.1170	10	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	11	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	12	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	13	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	14	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	15	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	16	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	17	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	18	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	19	0.0000	0.0000	0.0000
0.1170	13.2500	0.1170	20	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	21	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	22	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	23	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	24	0.0000	0.0000	0.0000
0.0130	0.0000	0.0130	25	0.0000	0.0000	0.0000

25 YEAR COMPONENT LISTING

Cases No.:111820-CABLE, THRMSETT., <15,000V. 111830-CABLE, SHIELDED, <15,000V.

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	10	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	20	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

Cases No.:111840-CABLE, FLEX. METALIC <600V. 111850-BRANCH WIRING, < 600V.

0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	10	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	20	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

Cases No.:111860-BRANCH WIRING, > 600V. 111870-BUSS DUCT

0.0000	0.0000	0.0000	1	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	2	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	3	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	4	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	5	0.0156	0.0000	0.0091
0.0000	0.0000	0.0000	6	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	7	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	8	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	9	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	10	0.0156	0.0000	0.0091
0.0000	0.0000	0.0000	11	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	12	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	13	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	14	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	15	0.0156	0.0000	0.0091
0.0000	0.0000	0.0000	16	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	17	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	18	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	19	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	20	0.3042	36.8350	0.1521
0.0000	0.0000	0.0000	21	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	22	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	23	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	24	0.0026	0.0000	0.0026
0.0000	0.0000	0.0000	25	0.0156	0.0000	0.0091

25 YEAR COMPONENT LISTING

Cases No.:111880-CONDUIT EMT

111910-METERS,DARS., GALVANOMETER

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	10	4.9998	583.0000	4.9998
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	20	0.9750	1485.0600	0.9750
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

Cases No.:111930-INVERTER

111940-RECTIFIER, < 600V.

10.1400	3.1800	7.6700	1	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	2	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	3	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	4	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	5	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	6	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	7	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	8	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	9	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	10	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	11	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	12	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	13	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	14	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	15	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	16	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	17	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	18	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	19	5.0700	0.0000	5.0700
2.0995	1711.9000	1.0497	20	2.0995	657.2000	1.0497
10.1400	3.1800	7.6700	21	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	22	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	23	5.0700	0.0000	5.0700
10.1400	3.1800	7.6700	24	8.1900	170.6600	8.1900
10.1400	3.1800	7.6700	25	5.0700	0.0000	5.0700

Cases No.:112210-SAFETY SWITCH, ENCLOSED

112231-CIR. BKR.,M.C.< 599V 1P

0.7930	0.0000	0.7930	1	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	2	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	3	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	4	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	5	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	6	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	7	0.8060	0.0000	0.8060
1.2935	0.0000	1.2935	8	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	9	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	10	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	11	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	12	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	13	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	14	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	15	0.8060	0.0000	0.8060
1.2935	0.0000	1.2935	16	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	17	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	18	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	19	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	20	1.7030	0.0000	1.7030
0.7930	0.0000	0.7930	21	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	22	0.8060	0.0000	0.8060
0.7930	0.0000	0.7930	23	0.8060	0.0000	0.8060
1.2935	0.0000	1.2935	24	0.8060	0.0000	0.8060
0.5654	41.3082	0.2827	25	0.8060	0.0000	0.8060

25 YEAR COMPONENT LISTING

Cases No.: 112232-CIR. BKR., M.C. < 599V 2P 112233-CIR. BKR., M.C. < 599V 3P

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.8060	0.0000	0.8060	1	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	2	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	3	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	4	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	5	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	6	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	7	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	8	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	9	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	10	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	11	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	12	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	13	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	14	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	15	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	16	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	17	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	18	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	19	0.8060	0.0000	0.8060
1.7030	0.0000	1.7030	20	1.7030	0.0000	1.7030
0.8060	0.0000	0.8060	21	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	22	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	23	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	24	0.8060	0.0000	0.8060
0.8060	0.0000	0.8060	25	0.8060	0.0000	0.8060

Cases No.: 112234-CIR. BKR., M.C. > 600V 1P 112235-CIR. BKR., M.C. > 600V 2P

1.2090	0.0000	1.2090	1	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	2	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	3	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	4	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	5	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	6	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	7	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	8	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	9	1.2090	0.0000	1.2090
3.3085	84.5880	3.3085	10	3.3085	84.5880	3.3085
1.2090	0.0000	1.2090	11	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	12	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	13	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	14	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	15	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	16	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	17	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	18	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	19	1.2090	0.0000	1.2090
3.3085	84.5880	3.3085	20	3.3085	84.5880	3.3085
1.2090	0.0000	1.2090	21	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	22	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	23	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	24	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	25	1.2090	0.0000	1.2090

Cases No.: 112236-CIR. BKR., M.C. > 600V 3P 112237-CIR. BKR., FIXED < 599V 1P

1.2090	0.0000	1.2090	1	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	2	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	3	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	4	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	5	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	6	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	7	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	8	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	9	0.4030	0.0000	0.4030
3.3085	84.5880	3.3085	10	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	11	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	12	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	13	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	14	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	15	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	16	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	17	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	18	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	19	0.4030	0.0000	0.4030
3.3085	84.5880	3.3085	20	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	21	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	22	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	23	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	24	0.4030	0.0000	0.4030
1.2090	0.0000	1.2090	25	0.4030	0.0000	0.4030

25 YEAR COMPONENT LISTING

Cases No.:112238-CIR. BKR.,FIXED <599V 2P 112239-CIR. BKR.,FIXED <599V 3P

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.4030	0.0000	0.4030	1	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	2	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	3	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	4	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	5	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	6	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	7	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	8	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	9	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	10	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	11	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	12	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	13	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	14	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	15	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	16	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	17	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	18	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	19	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	20	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	21	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	22	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	23	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	24	0.4030	0.0000	0.4030
0.4030	0.0000	0.4030	25	0.4030	0.0000	0.4030

Cases No.:11223A-CIR. BKR.,FIXED >600V 1P 11223B-CIR. BKR.,FIXED >600V 2P

1.2090	0.0000	1.2090	1	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	2	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	3	1.2090	0.0000	1.2090
3.3085	265.0000	3.3085	4	3.3085	265.0000	3.3085
1.2090	0.0000	1.2090	5	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	6	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	7	1.2090	0.0000	1.2090
3.3085	265.0000	3.3085	8	3.3085	265.0000	3.3085
1.2090	0.0000	1.2090	9	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	10	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	11	1.2090	0.0000	1.2090
0.9729	68.9000	0.9729	12	0.9729	256.5200	0.9729
1.2090	0.0000	1.2090	13	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	14	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	15	1.2090	0.0000	1.2090
3.3085	265.0000	3.3085	16	3.3085	265.0000	3.3085
1.2090	0.0000	1.2090	17	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	18	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	19	1.2090	0.0000	1.2090
3.3085	265.0000	3.3085	20	3.3085	265.0000	3.3085
1.2090	0.0000	1.2090	21	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	22	1.2090	0.0000	1.2090
1.2090	0.0000	1.2090	23	1.2090	0.0000	1.2090
0.9729	68.9000	0.9729	24	0.9729	256.5200	0.9729
1.2090	0.0000	1.2090	25	1.2090	0.0000	1.2090

Cases No.:11223C-CIR. BKR.,FIXED >600V 3P 112241-SAFETY SWITCH, FUSED, 1P

1.2090	0.0000	1.2090	1	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	2	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	3	0.7930	0.0000	0.7930
3.3085	265.0000	3.3085	4	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	5	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	6	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	7	0.7930	0.0000	0.7930
3.3085	265.0000	3.3085	8	1.2935	0.0000	1.2935
1.2090	0.0000	1.2090	9	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	10	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	11	0.7930	0.0000	0.7930
1.0572	328.6000	1.0572	12	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	13	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	14	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	15	0.7930	0.0000	0.7930
3.3085	265.0000	3.3085	16	1.2935	0.0000	1.2935
1.2090	0.0000	1.2090	17	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	18	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	19	0.7930	0.0000	0.7930
3.3085	265.0000	3.3085	20	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	21	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	22	0.7930	0.0000	0.7930
1.2090	0.0000	1.2090	23	0.7930	0.0000	0.7930
1.0572	328.6000	1.0572	24	1.2935	0.0000	1.2935
1.2090	0.0000	1.2090	25	0.5654	15.9000	0.2827

25 YEAR COMPONENT LISTING
Caces No.:112242-SAFETY SWITCH, FUSED, 2P 112243-SAFETY SWITCH, FUSED, 3P

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.7930	0.0000	0.7930	1	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	2	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	3	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	4	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	5	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	6	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	7	0.7930	0.0000	0.7930
1.2935	0.0000	1.2935	8	1.2935	0.0000	1.2935
0.7930	0.0000	0.7930	9	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	10	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	11	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	12	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	13	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	14	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	15	0.7930	0.0000	0.7930
1.2935	0.0000	1.2935	16	1.2935	0.0000	1.2935
0.7930	0.0000	0.7930	17	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	18	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	19	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	20	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	21	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	22	0.7930	0.0000	0.7930
0.7930	0.0000	0.7930	23	0.7930	0.0000	0.7930
1.2935	0.0000	1.2935	24	1.2935	0.0000	1.2935
0.5654	44.5200	0.2827	25	0.5654	100.7000	0.2827

Caces No.:112244-LOW VOLTAGE CARTRIDGE 112245-PLUG FUSE

0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	10	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	20	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

Caces No.:112360-MOTOR STARTER, < 600V. 112370-MOTOR STARTER, 601-15,000V.

1.3000	0.0000	1.3000	1	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	2	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	3	9.3002	79.5000	9.3002
1.3000	0.0000	1.3000	4	2.6000	0.0000	2.6000
3.2500	26.5000	3.2500	5	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	6	9.3002	79.5000	9.3002
1.3000	0.0000	1.3000	7	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	8	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	9	9.3002	79.5000	9.3002
3.2500	26.5000	3.2500	10	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	11	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	12	9.3002	79.5000	9.3002
1.3000	0.0000	1.3000	13	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	14	2.6000	0.0000	2.6000
3.2500	26.5000	3.2500	15	9.3002	79.5000	9.3002
1.3000	0.0000	1.3000	16	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	17	2.6000	0.0000	2.6000
0.8382	100.8696	0.8382	18	0.9010	2442.2400	0.4505
1.3000	0.0000	1.3000	19	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	20	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	21	9.3002	79.5000	9.3002
1.3000	0.0000	1.3000	22	2.6000	0.0000	2.6000
3.2500	26.5000	3.2500	23	2.6000	0.0000	2.6000
1.3000	0.0000	1.3000	24	9.3002	79.5000	9.3002
1.3000	0.0000	1.3000	25	2.6000	0.0000	2.6000

25 YEAR COMPONENT LISTING

Cases No.:112400-CONTACTORS AND RELAYS 112710-WIRING DEVICES, SWITCHES

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.4160	0.0000	0.4160	1	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	2	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	3	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	4	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	5	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	6	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	7	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	8	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	9	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	10	0.5005	1.5900	0.5005
0.4160	0.0000	0.4160	11	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	12	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	13	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	14	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	15	0.4774	4.4838	0.4774
0.4160	0.0000	0.4160	16	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	17	0.0000	0.0000	0.0000
0.7505	201.4000	0.7505	18	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	19	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	20	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	21	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	22	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	23	0.0000	0.0000	0.0000
3.0160	15.9000	3.0160	24	0.0000	0.0000	0.0000
0.4160	0.0000	0.4160	25	0.5005	1.5900	0.5005

Cases No.:112720-RECEPTACLES AND PLUGS 112730-SWITCH, PULL CORD

0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.5005	1.5900	0.5005
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	10	0.5005	1.5900	0.5005
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.4774	4.4838	0.4774
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.4774	5.8830	0.4774	20	0.5005	1.5900	0.5005
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.5005	1.5900	0.5005

Cases No.:113110-INCANDESCENT LIGHTING FIXT 113120-QUARTZ FIXTURE

0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0686	0.9540	0.0686	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0686	0.9540	0.0686	10	0.4228	48.9296	0.4228
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0686	0.9540	0.0686	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.4485	16.9600	0.4485	20	0.4485	58.3000	0.4485
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0686	0.9540	0.0686	25	0.0000	0.0000	0.0000

25 YEAR COMPONENT LISTING

Cases No.:113130-FLOUR. LIGHTING FIXT. 80W. 113141-MERCURY VAPOR FIXT. 175W.

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.8784	20.6700	0.8784	10	0.6840	81.6200	0.6840
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.7413	67.8400	0.7413	20	0.5816	134.6200	0.5816
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

Cases No.:113142-METAL-HALIDE FIXT. 175W. 113150-EMERGENCY LIGHTING FIXT.

0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0686	1.2084	0.0686
0.0686	42.4000	0.0686	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.6840	111.3000	0.6840	10	0.4586	2.4380	0.4586
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0686	1.2084	0.0686
0.0686	42.4000	0.0686	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.4355	197.1600	0.4355	20	3.1478	100.7000	3.1478
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0686	1.2084	0.0686
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0686	1.2084	0.0686
0.0686	42.4000	0.0686	25	0.0000	0.0000	0.0000

Cases No.:113161-H.P. SODIUM FIXT. 250W. 113162-L.P. SODIUM FIXT. 200W.

0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.8159	381.6000	0.4079	10	0.8159	196.1000	0.4079
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.4485	436.7200	0.2243	20	0.4485	341.3200	0.2243
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

25 YEAR COMPONENT LISTING

Cases No.:113170-EXIT LIGHT 114100-ELECTRICAL SERVICE GROUND

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	4	0.0000	0.0000	0.0000
0.0686	4.7700	0.0686	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0686	4.7700	0.0686	10	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0686	4.7700	0.0686	15	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.4485	13.4620	0.4485	20	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	24	0.0000	0.0000	0.0000
0.0686	4.7700	0.0686	25	1.0548	2.3532	1.0548

Cases No.:114200-BUILDING STRUCTURE GROUND 114311-LIGHTNING PROTECTION SYS.

0.0000	0.0000	0.0000	1	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	2	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	3	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	4	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	5	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	6	1.0548	3.7630	1.0548
1.0548	2.3532	1.0548	7	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	8	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	9	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	10	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	11	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	12	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	13	1.0548	3.7630	1.0548
1.0548	2.3532	1.0548	14	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	15	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	16	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	17	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	18	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	19	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	20	1.0548	3.7630	1.0548
1.0548	2.3532	1.0548	21	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	22	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	23	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	24	1.0548	3.7630	1.0548
0.0000	0.0000	0.0000	25	11.5266	779.8420	5.7633

Cases No.:114351-LIGHTNING GR. ROD 114400-COMPUTER GROUND SYSTEM

1.0548	3.7630	1.0548	1	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	2	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	3	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	4	0.2638	1.4416	0.2638
1.0548	3.7630	1.0548	5	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	6	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	7	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	8	0.2638	1.4416	0.2638
1.0548	3.7630	1.0548	9	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	10	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	11	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	12	0.2638	1.4416	0.2638
1.0548	3.7630	1.0548	13	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	14	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	15	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	16	0.2638	1.4416	0.2638
1.0548	3.7630	1.0548	17	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	18	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	19	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	20	0.2638	1.4416	0.2638
1.0548	3.7630	1.0548	21	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	22	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	23	0.0000	0.0000	0.0000
1.0548	3.7630	1.0548	24	0.2638	1.4416	0.2638
2.6000	14.2040	1.3000	25	0.0000	0.0000	0.0000

25 YEAR COMPONENT LISTING
Caces No.:114500-SPECIAL GROUND SYSTEM 121110-4-PIN RECEPTACLE

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	2	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	3	0.0000	0.0000	0.0000
0.2638	1.4416	0.2638	4	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	5	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	6	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	7	0.0000	0.0000	0.0000
0.2638	1.4416	0.2638	8	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	9	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	10	0.6006	0.9540	0.6006
0.0000	0.0000	0.0000	11	0.0000	0.0000	0.0000
0.2638	1.4416	0.2638	12	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	13	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	14	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	15	0.0000	0.0000	0.0000
0.2638	1.4416	0.2638	16	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	17	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	18	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	19	0.0000	0.0000	0.0000
0.2638	1.4416	0.2638	20	0.8060	2.7242	0.8060
0.0000	0.0000	0.0000	21	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	22	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	23	0.0000	0.0000	0.0000
0.2638	1.4416	0.2638	24	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	25	0.0000	0.0000	0.0000

25 YEAR COMPONENT LISTING

Cases No.:121120-TELEPHONE CABLE 121500-DOOR BELL

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.0000	0.0000	0.0000	1	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	2	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	3	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	4	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	5	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	6	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	7	0.3250	0.0000	0.3250
0.5512	0.4452	0.5512	8	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	9	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	10	0.9750	8.4800	0.9750
0.0000	0.0000	0.0000	11	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	12	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	13	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	14	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	15	3.2500	39.2200	3.2500
0.5512	0.4452	0.5512	16	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	17	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	18	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	19	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	20	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	21	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	22	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	23	0.3250	0.0000	0.3250
0.5512	0.4452	0.5512	24	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	25	0.9750	8.4800	0.9750

Cases No.:122110-MANUAL PULL STATION 122120-SMOKE DETECTOR

0.0000	0.0000	0.0000	1	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	2	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	3	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	4	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	5	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	6	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	7	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	8	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	9	0.1950	0.0000	0.1950
0.5200	0.7950	0.5200	10	0.7150	2.6500	0.7150
0.0000	0.0000	0.0000	11	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	12	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	13	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	14	0.1950	0.0000	0.1950
0.2834	40.2800	0.2834	15	0.4147	78.4400	0.4147
0.0000	0.0000	0.0000	16	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	17	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	18	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	19	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	20	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	21	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	22	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	23	0.1950	0.0000	0.1950
0.0000	0.0000	0.0000	24	0.1950	0.0000	0.1950
0.5200	0.7950	0.5200	25	0.7150	2.6500	0.7150

Cases No.:122130-FIRE ALARM BELL 122140-ANNUNCIATION PANEL

0.0000	0.0000	0.0000	1	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	2	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	3	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	4	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	5	1.4482	26.5000	1.4482
0.0000	0.0000	0.0000	6	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	7	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	8	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	9	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	10	1.4482	26.5000	1.4482
0.0000	0.0000	0.0000	11	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	12	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	13	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	14	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	15	1.7615	318.0000	1.7615
0.0000	0.0000	0.0000	16	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	17	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	18	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	19	1.0400	0.0000	1.0400
0.2873	34.9800	0.2873	20	1.4482	26.5000	1.4482
0.0000	0.0000	0.0000	21	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	22	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	23	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	24	1.0400	0.0000	1.0400
0.0000	0.0000	0.0000	25	1.4482	26.5000	1.4482

25 YEAR COMPONENT LISTING

Cases No.:122150-HEAT DETECTOR 122160-FIRE ALARM CONT. PANEL

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
0.1950	0.0000	0.1950	1	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	2	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	3	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	4	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	5	1.4482	26.5000	1.4482
0.1950	0.0000	0.1950	6	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	7	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	8	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	9	1.0400	0.0000	1.0400
0.7150	4.7700	0.7150	10	1.4482	26.5000	1.4482
0.1950	0.0000	0.1950	11	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	12	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	13	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	14	1.0400	0.0000	1.0400
0.4147	20.1400	0.4147	15	1.7615	848.0000	1.7615
0.1950	0.0000	0.1950	16	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	17	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	18	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	19	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	20	1.4482	26.5000	1.4482
0.1950	0.0000	0.1950	21	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	22	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	23	1.0400	0.0000	1.0400
0.1950	0.0000	0.1950	24	1.0400	0.0000	1.0400
0.7150	4.7700	0.7150	25	1.4482	26.5000	1.4482

Cases No.:123300-TV CABLE OUTLET 124300-LIGHT DIMMING PANEL

0.0000	0.0000	0.0000	1	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	2	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	3	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	4	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	5	0.7332	37.1000	0.7332
0.0000	0.0000	0.0000	6	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	7	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	8	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	9	0.3250	0.0000	0.3250
0.6006	0.9540	0.6006	10	0.7332	37.1000	0.7332
0.0000	0.0000	0.0000	11	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	12	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	13	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	14	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	15	1.7615	265.0000	1.7615
0.0000	0.0000	0.0000	16	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	17	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	18	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	19	0.3250	0.0000	0.3250
0.8060	13.2500	0.8060	20	0.7332	37.1000	0.7332
0.0000	0.0000	0.0000	21	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	22	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	23	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	24	0.3250	0.0000	0.3250
0.0000	0.0000	0.0000	25	0.7332	37.1000	0.7332

Cases No.:126110-TIME CONTROL CLOCK 127100-BASEBOARD HEATING UNITS

0.3250	0.0000	0.3250	1	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	2	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	3	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	4	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	5	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	6	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	7	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	8	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	9	2.1996	0.0000	2.1996
1.6250	13.2500	1.6250	10	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	11	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	12	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	13	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	14	2.8002	0.0000	2.8002
1.5600	62.2220	1.5600	15	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	16	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	17	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	18	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	19	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	20	2.4999	237.4400	2.4999
0.3250	0.0000	0.3250	21	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	22	2.8002	0.0000	2.8002
0.3250	0.0000	0.3250	23	2.1996	0.0000	2.1996
0.3250	0.0000	0.3250	24	2.8002	0.0000	2.8002
1.6250	13.2500	1.6250	25	2.1996	0.0000	2.1996

25 YEAR COMPONENT LISTING
Caces No.:127210-WALL MTD./RECESS.,WITH FAN 127220-RADIANT SUSPENDED, COMM.

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
1.0998	0.0000	1.0998	1	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	2	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	3	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	4	2.8002	0.0000	2.8002
2.0748	37.1000	2.0748	5	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	6	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	7	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	8	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	9	2.1996	0.0000	2.1996
2.0748	37.1000	2.0748	10	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	11	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	12	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	13	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	14	2.8002	0.0000	2.8002
2.0748	37.1000	2.0748	15	2.4999	265.0000	2.4999
1.0998	0.0000	1.0998	16	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	17	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	18	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	19	2.8002	0.0000	2.8002
2.4999	137.8000	2.4999	20	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	21	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	22	2.1996	0.0000	2.1996
1.0998	0.0000	1.0998	23	2.8002	0.0000	2.8002
1.0998	0.0000	1.0998	24	2.1996	0.0000	2.1996
2.0748	37.1000	2.0748	25	2.8002	0.0000	2.8002

Caces No.:127230-INFARED SUSPENDED, COMM. 127310-STANDARD SUSPENDED HEATER

2.8002	0.0000	2.8002	1	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	2	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	3	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	4	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	5	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	6	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	7	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	8	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	9	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	10	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	11	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	12	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	13	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	14	2.8002	26.5000	2.8002
2.4999	168.5400	2.4999	15	2.4999	265.0000	2.4999
2.8002	0.0000	2.8002	16	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	17	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	18	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	19	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	20	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	21	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	22	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	23	2.8002	26.5000	2.8002
2.8002	0.0000	2.8002	24	2.1996	0.0000	2.1996
2.8002	0.0000	2.8002	25	2.8002	26.5000	2.8002

Caces No.:127320-EXPLOSION PROOF INDUSTRIAL 127400-DUCT HEATER

2.1996	0.0000	2.1996	1	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	2	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	3	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	4	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	5	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	6	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	7	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	8	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	9	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	10	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	11	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	12	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	13	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	14	2.8002	53.0000	2.8002
2.4999	530.0000	2.4999	15	2.4999	278.7800	2.4999
2.1996	0.0000	2.1996	16	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	17	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	18	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	19	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	20	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	21	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	22	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	23	2.8002	53.0000	2.8002
2.1996	0.0000	2.1996	24	2.8002	53.0000	2.8002
2.8002	53.0000	2.8002	25	2.8002	53.0000	2.8002

25 YEAR COMPONENT LISTING

Cases No.:128110-GEN., GASOLINE, 1000KW. 128120-GENERATOR, DIESEL, 1000KW.

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
9.5940	0.0000	9.5940	1	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	2	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	3	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	4	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	5	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	6	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	7	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	8	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	9	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	10	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	11	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	12	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	13	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	14	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	15	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	16	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	17	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	18	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	19	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	20	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	21	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	22	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	23	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	24	9.5940	0.0000	9.5940
280.0200	212000.0000	140.0100	25	280.0200	212000.0000	70.0050

Cases No.:128130-GEN., VAPOR GAS, 1000KW. 128141-GEN., STEAM TURBINE, 1000KW

9.5940	0.0000	9.5940	1	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	2	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	3	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	4	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	5	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	6	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	7	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	8	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	9	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	10	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	11	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	12	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	13	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	14	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	15	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	16	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	17	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	18	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	19	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	20	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	21	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	22	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	23	9.5940	0.0000	9.5940
9.5940	0.0000	9.5940	24	9.5940	0.0000	9.5940
280.0200	212000.0000	70.0050	25	200.9800	265000.0000	50.2450

Cases No.:128142-GEN., GAS TURBINE, 1000KW. 128150-TRANSFER SWITCH

9.5940	0.0000	9.5940	1	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	2	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	3	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	4	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	5	3.0160	15.9000	3.0160
9.5940	0.0000	9.5940	6	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	7	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	8	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	9	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	10	3.0160	15.9000	3.0160
9.5940	0.0000	9.5940	11	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	12	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	13	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	14	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	15	3.0160	15.9000	3.0160
9.5940	0.0000	9.5940	16	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	17	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	18	0.7502	468.5200	0.7502
9.5940	0.0000	9.5940	19	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	20	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	21	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	22	0.4160	0.0000	0.4160
9.5940	0.0000	9.5940	23	3.0160	15.9000	3.0160
9.5940	0.0000	9.5940	24	0.4160	0.0000	0.4160
400.0100	265000.0000	200.0050	25	0.4160	0.0000	0.4160

25 YEAR COMPONENT LISTING

Cases No.:128210-STATIC - CHARGER, BATTERY 128220-MOTOR - GENERATOR, BATTERY

LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS	YR	LABOR HOURS	MATERIALS \$	EQUIPMENT HOURS
5.0700	0.0000	5.0700	1	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	2	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	3	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	4	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	5	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	6	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	7	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	8	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	9	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	10	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	11	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	12	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	13	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	14	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	15	5.3300	181.2600	5.3300
8.1900	24.3800	8.1900	16	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	17	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	18	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	19	7.7961	60.4200	7.7961
2.0995	596.7800	2.0995	20	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	21	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	22	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	23	7.7961	60.4200	7.7961
8.1900	24.3800	8.1900	24	7.7961	60.4200	7.7961
5.0700	0.0000	5.0700	25	7.7961	60.4200	7.7961

Cases No.:128310-BATTERY, PRIMARY WET 128320-BATTERY, PRIMARY DRY

26.0260	0.0000	26.0260	1	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	2	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	3	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	4	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	5	0.3991	53.0000	0.3991
26.0260	0.0000	26.0260	6	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	7	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	8	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	9	6.0060	0.0000	6.0060
0.3991	265.0000	0.3991	10	0.3991	53.0000	0.3991
26.0260	0.0000	26.0260	11	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	12	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	13	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	14	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	15	0.3991	53.0000	0.3991
26.0260	0.0000	26.0260	16	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	17	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	18	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	19	6.0060	0.0000	6.0060
0.3991	265.0000	0.3991	20	0.3991	53.0000	0.3991
26.0260	0.0000	26.0260	21	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	22	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	23	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	24	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	25	0.3991	53.0000	0.3991

Cases No.:128330-BATTERY, SECONDARY WET 128340-BATTERY, SECONDARY DRY

26.0260	0.0000	26.0260	1	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	2	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	3	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	4	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	5	0.3991	106.0000	0.3991
26.0260	0.0000	26.0260	6	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	7	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	8	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	9	6.0060	0.0000	6.0060
0.3991	371.0000	0.3991	10	0.3991	106.0000	0.3991
26.0260	0.0000	26.0260	11	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	12	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	13	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	14	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	15	0.3991	106.0000	0.3991
26.0260	0.0000	26.0260	16	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	17	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	18	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	19	6.0060	0.0000	6.0060
0.3991	371.0000	0.3991	20	0.3991	106.0000	0.3991
26.0260	0.0000	26.0260	21	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	22	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	23	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	24	6.0060	0.0000	6.0060
26.0260	0.0000	26.0260	25	0.3991	106.0000	0.3991

APPENDIX B:

GEOGRAPHICAL LOCATION FACTORS

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Alabama	State Average	.86
	Birmingham	.96
	Mobile	.86
	Montgomery	.76
	Anniston Army Depot	.81
	Huntsville	.88
	Fort McClellan	.80
	Redstone Arsenal	.88
Alaska	Fort Rucker	.80
	State Average	2.25
	Anchorage	1.92
	Delta Junction	2.70
	Fairbanks	2.13
	Adak	3.88
	Aleutian Islands	3.86
	Anchorage NSGA	1.92
	Barrow	4.18
	Burnt Mtn.	6.86
	Clear	3.10
	Eielson AFB	2.13
	Elmendorf AFB	1.92
	Galena	3.73
	Fort Greely	2.70
	Fort Richardson	1.92
	Fort Wainwright	2.13
Arizona	State Average	1.02
	Flagstaff	1.02
	Phoenix	.99
	Tucson	1.05
	Fort Huachuca	1.22
	Yuma Proving Ground	1.31
Arkansas	Yuma	1.31
	State Average	.89
	Pinebluff	.93
	Little Rock	.83
	Fort Smith	.92
	Fort Chaffee	.92
California	Pine Bluff Arsenal	.93
	State Average	1.21
	Los Angeles	1.20
	San Diego	1.18
	San Francisco	1.25
	Beale	1.28
	Bridgeport NUTC	1.27
	Castle	1.13
	Centerville Beach	1.32
	Desert Area	1.18
	Edwards AFB	1.30

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
California (Cont'd)	El Centro	1.27
	George AFB	1.31
	Fort Hunter Liggett	1.29
	Fort Irwin	1.20
	Le Moore NAS	1.20
	March AFB	1.18
	Mather AFB	1.17
	McClellan AFB	1.17
	Monterey Area	1.23
	Presidio of Monterey	1.23
	Norton AFB	1.16
	Oakland Army Base	1.33
	Fort Ord	1.24
	Port Hueneme Area	1.20
	Riverside	1.18
	Sacramento	1.15
	Sacramento Army Depot	1.15
	Presidio of San Francisco	1.25
	San Nicholas Island	2.59
	Sharpe Army Depot	1.13
	Sierra Army Depot	1.33
	Stockton	1.15
	Travis AFB	1.27
	Vandenburg AFB	1.38
Colorado	State Average	.98
	Colorado Springs	.94
	Denver	1.04
	Pueblo	.96
	Fort Carson	1.01
	Fitzsimmons AMC	1.06
	Pueblo Army Depot	.96
	Peterson AFB	.94
	Rocky Mountain Arsenal	1.06
	State Average	1.13
Connecticut	Bridgeport	1.16
	Hartford	1.10
	New London	1.14
Delaware	State Average	.99
	Dover	1.04
	Lewes	.98
	Milford	.96
	Lewes NF	1.04
	Dover AFB	1.04
District of Columbia	Washington	1.03
	Fort McNair	1.03
	Walter Reed AMC	1.03
Florida	State Average	.89
	Miami	.95
	Panama City	.92
	Tampa	.79
	Cape Canaveral	.96
	Cape Kennedy	.96

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Florida (Cont'd)	Gulf Coast	.85
	Homestead AFB	.88
	Homestead	.88
	Jacksonville Area	.85
	Key West NAS	1.08
	Orlando	.80
	Pensacola Area	.85
	McDill AFB	.77
	Eglin AFB	.77
	Tyndall AFB	.92
	State Average	.80
	Albany	.82
	Atlanta	.87
	Macon	.70
Georgia	Athens	.90
	Atlanta-Marietta	.93
	Fort Benning	.71
	Columbus	.71
	Fort Gillem	.87
	Fort Gordon	.94
	Kings Bay	.93
	Fort McPherson	.87
	Fort Stewart	.84
	State Average	1.28
	Hawaii	1.29
	Honolulu	1.27
	Maui	1.29
Hawaii	Alimenu	1.27
	Barbars Point NAS	1.34
	Fort Debussy	1.27
	EWA Beach Area	1.34
	Helemano	1.34
	Hickam Army Air Field	1.27
	Kaneohe MCAS	1.34
	Moanalua	1.27
	Pearl City	1.27
	Pearl Harbor	1.27
	Pohakuloa	1.32
	Schofield Barracks	1.27
	Fort Shafter	1.27
	Tripler AMC	1.27
Idaho	Wheeler Army Air Field	1.34
	State Average	1.11
	Boise	1.05
	Idaho Falls	1.08
Illinois	Mountain Home	1.19
	Mountain Home AFB	1.20
	State Average	1.03
	Belleville	.96
	Chicago	1.09
	Rock Island	1.03
	Rock Island Arsenal	1.06

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Illinois (Cont'd)	St. Louis Support Ctr	.96
	Savannah Army Depot	1.05
	Scott AFB	1.03
	Fort Sheridan	1.10
Indiana	State Average	.99
	Indianapolis	1.03
	Logansport	.99
	Madison	.94
	Fort Benjamin Harrison	1.07
	Crane	1.10
	Crane AAP	1.10
	Grissom AFB	1.06
	Indiana AAP	1.02
	Jefferson Proving Ground	.94
Iowa	State Average	1.02
	Burlington	1.04
	Cedar Rapids	.98
	Des Moines	1.05
	Iowa AAP	1.06
	State Average	.94
Kansas	Manhattan	.97
	Topeka	.96
	Wichita	.88
	Kansas AAP	.94
	Fort Leavenworth	.94
	Fort Riley	.97
	Sunflower AAP	.97
	State Average	.96
	Bowling Green	.99
	Lexington	.96
Kentucky	Louisville	.93
	Fort Campbell	.93
	Fort Knox	.99
	Lexington/Bluegrass Army Depot	1.06
	Louisville NAS	.93
	State Average	.92
	Alexandria	.87
	New Orleans	.94
	Shreveport	.94
	Barksdale AFB	.94
Louisiana	England AFB	.87
	Gulf Outport New Orleans	.94
	Louisiana AAP	.94
	Fort Polk	.94
	State Average	.93
	Bangor	.85
	Caribou	.99
	Portland	.94
	Brunswick	.93
	Cutler	.98
Maine	Northern Area	1.17
	Winter Harbor	.98

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Maryland	State Average	.97
	Baltimore	.95
	Fredrick	.94
	Lexington Park	1.01
	Aberdeen Proving Ground	.94
	Annapolis	1.03
	Fort Detrick	.94
	Harry Diamond Lab	1.00
	Fort Meade	.95
	Patuxent River Area	1.08
	Fort Ritchie	.90
Massachusetts	State Average	1.10
	Boston	1.13
	Fitchburg	1.08
	Springfield	1.08
	Army Mtls & Mech Research Ctr	1.13
	Fort Devens	1.15
	Natick Research & Development Ctr	1.13
	South Weymouth	1.13
	State Average	1.06
Michigan	Bay City	1.02
	Detroit	1.14
	Marquette	1.03
	Detroit Arsenal	1.14
	Northern Area	1.25
	Republic (Elfcom)	1.10
	Selfridge AFB	1.14
	State Average	1.08
Minnesota	Duluth	1.05
	Minneapolis	1.09
	St. Cloud	1.10
	Twin Cities AAP	1.09
	State Average	.84
	Biloxi	.87
Mississippi	Columbus	.81
	Jackson	.84
	Columbus AFB	.81
	Gulfport Area	.87
	Meridian	.92
	State Average	.92
	Kansas City	.92
	St. Louis	.99
Missouri	Rolla	.85
	Lake City AAP	.93
	Fort Leonard Wood	.91
	State Average	1.15
	Billings	1.15
	Butte	1.18
	Great Falls	1.12
Montana	Malmstrom AFB	1.12
	State Average	1.03
	Grand Island	1.00
	State Average	1.00

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Nebraska (Cont'd)	Lincoln	1.05
	Omaha	1.05
	Offutt AFB	1.05
Nevada	State Average	1.18
	Hawthorne	1.26
	Las Vegas	1.13
	Reno	1.15
	Fallon	1.28
	Hawthorne AAP	1.26
	Nellis AFB	1.13
	State Average	1.09
New Hampshire	Concord	1.06
	Nashua	1.06
	Portsmouth	1.14
	Cold Regions Lab	1.17
	State Average	1.08
	Newark	1.11
	Red Bank	1.08
	Trenton	1.06
New Jersey	Bayonne	1.10
	Bayonne Mil Ocean Term	1.09
	Fort Dix	1.03
	Earle	1.10
	Lakehurst	1.05
	Fort Monmouth	1.09
	Picatinny Arsenal	1.20
	State Average	1.03
	Alamogordo	.99
	Albuquerque	1.03
	Gallup	1.06
	Holloman AFB	1.05
	Kirtland AFB	1.03
	White Sands Missile Range	1.09
	Fort Wingate	1.06
New Mexico	State Average	1.12
	Albany	1.07
	New York City	1.24
	Syracuse	1.05
	Brooklyn	1.24
	Fort Drum	1.18
	Fort Hamilton	1.24
	Seneca Army Depot	1.15
	U.S. Military Academy	1.17
	Watervliet Arsenal	1.07
	State Average	.76
	Fayetteville	.76
	Greensboro	.75
	Wilmington	.78
	Fort Bragg	.76
New York	Camp Lejeune Area	.86
	Cherry Point	.86
	Goldsboro	.77
North Carolina		

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
North Carolina (Cont'd)	Pope AFB	.82
	Seymour AFB	.77
North Dakota	Sunny Point Mil Ocean Term	.78
	State Average	1.03
	Bismarck	1.02
	Grand Forks	.98
	Minot	1.10
	Grand Forks AFB	.98
	Stanley R. Hicklesen CPX	1.03
Ohio	Minot AFB	1.12
	State Average	1.00
	Columbus	1.03
	Dayton	.98
	Youngstown	.99
Oklahoma	Cleveland	1.14
	Wright-Patterson AFB	.98
	State Average	.93
	Lawton	.90
	McAlester	.91
	Oklahoma City	.98
	Altus AFB	.94
	Enid	1.01
	McAlester AAP	.91
	Fort Sill	.90
Oregon	State Average	1.05
	Pendleton	1.08
	Portland	1.07
	Salem	.99
	Charleston	1.11
	Coos Head	1.08
	Umatilla Army Depot	1.18
	State Average	1.00
Pennsylvania	Harrisburg	.91
	Philadelphia	1.05
	Pittsburgh	1.04
	Carlisle Barracks	.93
	New Cumberland Army Depot	.91
	Fort Indiantown Gap	1.07
	Letterkenny Army Depot	1.07
	Mechanicsburg Area	.91
	Tobyhanna Army Depot	1.14
	Warminster Area	1.04
	State Average	1.11
	Bristol	1.13
	Newport	1.11
Rhode Island	Providence	1.10
	Davisville	1.17
	State Average	.82
South Carolina	Charleston	.81
	Columbia	.82
	Myrtle Beach	.84
	Beaufort Area	.89

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
South Carolina (Cont'd)	Charleston AFB	.81
	Fort Jackson	.82
	Sumter	.80
South Dakota	State Average	.95
	Aberdeen	.95
	Sioux Falls	.94
	Rapid City	.96
	Ellsworth AFB	.98
Tennessee	State Average	.84
	Chattanooga	.86
	Kingsport	.72
	Memphis	.95
	Arnold AFB	.90
	Milan AAP	.98
	Holston AAP	.71
Texas	State Average	.85
	San Angelo	.76
	San Antonio	.86
	Fort Worth	.93
	Fort Bliss	.96
	Carswell AFB	.93
	Chase Field - Beeville	.97
	Corpus Christi Army Depot	.92
	Corpus Christi	.92
	Dallas	.93
	Dyess AFB	.94
	Fort Hood	.89
	Kingsville	.99
	Red River Army Depot	.78
	Fort Sam Houston	.86
	William Beaumont AMC	.96
	Bergstrom AFB	.95
	Brooks AFB	.86
	Randolph AFB	.86
	Kelly AFB	.86
	Lackland AFB	.86
Utah	State Average	1.03
	Ogden	1.05
	Salt Lake City	1.00
	Tooele	1.06
	Dugway Proving Ground	1.03
	Hill AFB	1.07
	Tooele Army Depot	1.05
Vermont	State Average	.99
	Burlington	1.00
	Montpelier	1.00
	Rutland	.96
Virginia	State Average	.95
	Norfolk	.95
	Radford	.95
	Richmond	.94
	Arlington	1.04

<u>State</u>	<u>Location</u>	<u>ACF Index</u>
Virginia (Cont'd)	Arlington Hall Station	1.04
	Arlington National Cemetery	1.04
	Fort Belvoir	1.04
	Cameron Station	1.04
	Dahlgren	1.10
	Fort Eustis	.96
	Humphreys Engineer Center	1.03
	Fort A.P. Hill	.92
	Fort Lee	.93
	Fort Monroe	.94
	Fort Myer	1.03
	Norfolk-Newport News Area	.95
	Fort Pickett	.98
	Quantico	1.03
	Nadford AAP	1.02
	Port Story	.95
	Vint Hill Farms Station	1.08
Washington	State Average	1.09
	Spokane	1.08
	Tacoma	1.07
	Yakima	1.11
	Fairchild AFB	1.13
	Jim Creek	1.34
	Fort Lewis	1.07
	Pacific Beach	1.27
	Puget Sound Area	1.15
	Seattle Area	1.12
	Widbey Island	1.12
	Yakima Firing Center	1.18
West Virginia	State Average	.95
	Bluefield	.92
	Clarksburg	.95
	Charleston	.99
	Sugar Grove	1.15
Wisconsin	State Average	1.06
	LaCrosse	1.04
	Madison	1.02
	Milwaukee	1.13
	Badger AAP	1.06
	Clam Lake	1.20
	Fort McCoy	1.11
Wyoming	State Average	1.08
	Casper	1.07
	Cheyenne	1.10
	Laramie	1.08
	F.F. Warren AFB	1.10

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